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PHYSICIAN OF FUTURE TO KEEP PATIENTS WELL

The chief role of the family physician of the future will be to keep his patients well rather than to treat them when they are sick. Preventive medicine and public health education were the text upon which Dr. Wendell C. Phillips, the newly installed president of the American Medical Association, based his address at the opening session of the recent annual meeting of that organization.

Complete eradication of measles, whooping cough, scarlet fever, possibly all the eruptive diseases, as well as all the insect borne plagues, is a potential development of the future pictured by Dr. Phillips.

The physician of the past, he said, was educated to treat disease. He knew little of preventive medicine, sanitation or hygiene, fields in which national, state and municipal departments have become powerful and controlling factors. The health measures of great industrial organizations, pay clinics and group practice have of late years brought great health benefit to hundreds of thousands.

The publicity work of all these agencies has gradually created a demand from the public for more information about personal health, which should be met, said Dr. Phillips, by a wide and comprehensive plan of personal and public health education of which the educated physician should be the source and head. Much pressure is being brought to bear at the present time to breakdown the reticent attitude of the medical profession toward the press. The House of Delegates of the American Medical Association is on record as favoring every measure of public health education and the better class of publications have given their cooperation by publishing only material of this character that has received medical approval.

Periodic physical examination of the healthy as well as the sick is a preventive measure strongly endorsed by the medical profession in the general program of health preservation.

"The family physician of the future," said Dr. Phillips, "must educate his patients and community in preventive medicine and be to some extent a health administrator. His chief role and his chief service will be to keep his patients well. Evidently, such service can be made possible only by maintaining intimate, clinical information, well recorded, regarding every man, woman and child who seeks his service. And every man, woman and child in every community should have his health recorded in the files of his family physician. Too many of our inhabitants worry through life with only fairly good health, and while they accomplish their daily duties, these fairly well persons may never know the exuberance and happiness of

perfect health. Hence, one goal of the future practitioner of medicine will be the attainment and maintenance of exuberant health, which is the inherent right of every person. A higher average of overflowing good health means a higher average of happiness, comfort, usefulness and economic value of the individual. The superman will never materialize without superhealth."

Medical education, Dr. Phillips went on to say, will place more emphasis on the human side and less on the mechanical and technical than at present. The curriculum of the undergraduate should be extended to include health conservation and the application of the principles of science through the personal relations of the physician and patient.

The address closed with a tribute to the importance of the general practitioner as a factor in the nation's health life and the significant statement that while the service rendered by a physician may not be considered in terms of finance it should be remembered that health conservation is of greater value than the sums paid out for helping the body repair the ravages of disease.

METAL WELDING METHODS REVOLUTIONIZED BY NEW INVENTIONS

Methods of welding metals together will be revolutionized by two new inventions of the research laboratories of the General Electric Company, for after years of search it is now possible to weld so that the fused metal is as strong and as ductile as if it were never in two pieces. Previous methods, using an arc to furnish the intense necessary heat, resulted in the formation of compounds of the metal with oxygen and nitrogen so that the weld was not as strong as the rest of the piece.

As the nitrogen and oxygen which unite with the metal come from the air, in these new processes the air is excluded when the weld is being made by a bath of hydrogen, water gas, wood alcohol vapor, and others which do not easily form metallic compounds.

One of the methods was developed by Dr. Irving Langmuir, assistant director of the Schenectady laboratory, and makes use of what he calls flames of atomic hydrogen, based on a discovery of Dr. R. W. Wood, professor of experimental physics at Johns Hopkins University. Electric currents of twenty amperes and at voltages ranging from 300 to 800 were passed through two tungsten rods so as to form an arc similar to the arc between carbon rods in a street arc light.

By passing a stream of hydrogen gas into the arc from a small tube, an intensely hot flame is produced, because the molecules of hydrogen are broken up by the temperature of the arc into their constituent atoms. As the ordinary form of hydrogen is that of molecules, the atoms almost immediately recombine, but in doing so they liberate great amounts of heat, about half again as much as the oxy-hydrogen flame.

Iron rods an eighth of an inch in diameter melt within a few seconds when held about an inch above the arc, says Dr. Langmuir. Metals even harder to melt than iron, such as tungsten and molybdenum, one of the most refractory substances known, melt with ease. Quartz, however, melts with more difficulty than molybdenum, which Dr. Langmuir suggests as being due to the fact that the metals act as a catalyzer

or a substance which speeds up a chemical change.

"The use of hydrogen under these conditions for melting metals has proved to have many advantages," Dr. Langmuir said. "Iron can be melted or welded without contamination by carbon, oxygen or nitrogen. Because of the powerful reducing action of the atomic hydrogen, alloys containing chromium, aluminum, silicon or manganese can be welded without fluxes without surface oxidation. The rapidity with which such metals as iron can be melted seems to exceed that of the oxy-acetylene flame, so that the process promises to be particularly valuable for welding.

The other method of producing ductile welds was developed at the Thomson Research Laboratory of the General Electric Company at Lynn, Mass., by Peter Alexander, independently of Dr. Langmuir's work. The electric arc is passed between the metal to be welded and an iron electrode, and the gaseous atmosphereis supplied in the form of a stream around the arc, so as to keep it entirely away from air. Pure hydrogen, water gas, methanol or wood alcohol vapor, or dry ammonia can be used, as well as a mixture of hydrogen and nitrogen, for it is found that the nitrogen is not harmful unless oxygen is also present. All of these mixtures contain hydrogen, and Dr. Langmuir suggests that this method also depends in part for its efficacy on the disintegration of hydrogen molecules into their atoms.

GERM THEORY OF CANCER REFUTED

The germ that causes cancer, if there is one, has not been discovered yet. Dr. James B. Murphy of the Rockefeller Institute for Medical Research has repeated the experiments of Dr. W. E. Gye and J. E. Barnard which attracted such wide attention last summer and in a report of his results appearing in a recent issue of the Journal of the American Medical Association he holds his experiment refutes their contention that chicken tumor is caused by a micro-organism.

The English scientists reported that they produced tumors in chickens by injections of the filtered juice from chicken tumor in the presence of a second chemical factor. They also produced tumorous growths in chickens with filtrates from malignant growths from other animals - mice, rats and even humans, in the presence of this second factor. This necessary secondary element was nothing else than filtered juice, or filtrate of chicken tumor treated with chloroform. None of these substances would produce a tumor or cancer when used alone.

By means of a complicated ultra-microscope employing ultra-violet light they studied the cell-free filtrate and detected the presence of a micro-organism which they believed was the causative agent of cancer.

A cancer consists of rapidly subdividing cells that keep on growing and will not stop. Such a condition of normal growth is found in the rapid cell subdivision of an embryo. At the Rockefeller Institute it was decided to try to produce a cancerous growth with a filtrate from embryohic tissue used in the same way as the juice from the malignant growths. In accordance with this idea the filtered juice from ground-up bits of chick embryo and rat placenta were injected into hens along with the chloroform treated filtrate of chicken tumor and it was found that cancer resulted just as it did following the injection from malignant growths.

Dr. Murphy says in explanation:

"Apparently thepower to activate a chloroformed filtrate cannot be considered as proof of the action of a living organism, for cultures of embryonic tissue or placenta are just as potent in this respect as so-called cultures of malignant tissues.

"Two possibilities present themselves in explanation of the results attained. First, that the causative agent of the chicken tumor is in the nature of an enzyme-like substance which is inactivated by chloroform and may be reactivated by a diffusible substance from malignant tumors, embryonic tissues and placental tissues. The second possibility is that the chloroform treatment does not destroy but simply attenuates the causative agent to a point at which unaided it is too weak to induce a tumor but in conjunction with some injurious or stimulating substance supplied by the 'culture' it becomes effective. The fact that a great excess of chloroform so completely destroys the agent that no reactivation is possible is rather in favor of the latter possibility. Further experiments are in progress to elucidate these points."

REMOVAL OF ONE IDEA WOULD COLLAPSE CIVILIZATION, MILLIKAN SAYS

Two ideas, one three hundred years old and the other very new, that have exerted a powerful influence upon man's ideas of the world in which he lives, were explained by Dr. Robert A. Millikan, director of the Norman Bridge Laboratory of Physics at Pasadena, Calif., in the annual Messenger lectures that he delivered at Cornell University in April.

"One idea has probably already exerted a larger influence upon the destinies of the race than any other which has ever entered the human mind." Dr. Millikan said. "This is the one which underlies the whole of modern mechanics, theoretical and applied, and which came into human thought in a large way beginning with Galileo."

Expressed quantitatively this idea takes the form of the second law of Newton, which says that force, f, equals mass, m, multiplied by acceleration, a.

"If this idea were removed from modern civilization, it would cause the whole of it to collapse like a house of cards and throw back the world, so far as its material life is concerned, to the conditions existing in the civilization of ancient Rome," Dr. Millikan declared.

The other and younger idea is that of the electrical constitution of matter. According to Dr. Millikan, this idea, which although now less than thirty years old, including as it does radio activity, electronics, quantum theory, and relativity, has already had such enormous consequences in changing the conceptions of man about the physical world in which he lives and in practical applications to his daily life that it justifies the expectation that it will be of no less significance than the first.

The development of this idea of the electrical constitution of matter, in which Dr. Millikan has so greatly participated, is the subject of his lectures.

NEW IDEAS OF LIGHT DECLARED IRRECONCILABLE WITH PAST

The new light on light gained by recent experiments is irreconcilable in many cases with the nineteenth centuryconceptions of the nature of radiation, Dr. Robert A. Millikan, director of the Norman Bridge Laboratory of Physics, Pasadena, revealed during the course of lectures at Cornell University.

"Very recently there has come into the possession of the race," said Dr. Millikan "knowledge of the relation between the frequency of ether waves and the energy of the electrons which emit or absorb these frequencies. This relation was not only undreamed of twenty years ago but it is completely irreconcilable with nineteenth century conceptions of the nature of radiation and the nature of the changes in the material bodies giving rise to ether waves."

The light that the human eye sees, the radio waves, the X-rays, the ultra-violet and infra-red rays are all ether waves that are radiated by electrons. And electrons are both matter and electricity and the stuff out of which the world is made.

Three Nobel prizes have been awarded, at least in part, for the development of this relation between the frequency of the ether waves and the energy of the electrons. The relation is expressed in the mathematical equation which states that half the mass multiplied by the square of the velocity, an expression that represents the energy of the electron, is equal to a constant of energy emission multiplied by the frequency of the radiating body minus the work necessary to get the electron out. This formula is the one for the first conception of which Einstein was given the Nobel prize in 1921; for the most important theoretical application of which Bohr was given the Nobel prize in 1922; and in part for the exact experimental proof of the validity of which the same prize for 1923 was awarded to Millikan.

Dr. Millikan in explaining this new conception stated that its correctness has been substantiated by very recent evidence furnished by experiments of Prof. A. H. Compton at Chicago, Profs. Bothe and Geiger at Berlin and E. C. Watson at Pasadena.

HOW ATOM SHUDDER CREATES LIGHT CALLED DEEPEST MYSTERY

One of the deepest of scientific mysteries today is the as yet completely unknown way in which the atom is able to transmute the energy of an atomic shudder into an ether or light wave of a single color. Dr. Robert A. Millikan, director of the Norman Bridge Laboratory of Physics, Pasadena, and Nobel prize winner, has declared in lectures recently before Cornell University that the way that the atom gives off light or other radiation does not consist, as nineteenth century physicists always assumed, in the vibration of particles synchronously with the frequency of the emitted ether wave.

The physicist is now perforce obliged to forego the attempt, at least at present, to find a mechanical picture of the act of radiation," Dr. Millikan explained, "an act which, however, ejects a ray from the atom which has a definitely measurable frequency and the frequency which is a definite measure of the energy lost by the

atom in the act of ejection. This energy appears at present to travel through space at least when the frequency is sufficiently high, as a vibratory dart of light."

Man is now able, thanks to science, to see the invisible, Dr. Millikan said. There has been a gradual extension in recent years of man's ability to receive and interpret ether waves which come to him outside the range in which he is endowed by nature with an organ, namely, the eye, capable of responding to ether waves at all.

"The range of frequencies to which the eye can respond is less than a single octave," he said, "and yet 100 years ago all that man had ever known of the outside world had been received through the aid of this little range of ether vibration. But beginning with the year 1881 and continuing up to within the last few months in which the higher frequency cosmic rays have been under quantity investigation, the range of man's perception has been extended, practically without breaks anywhere, through the ultra-red spectrum, the wireless wave spectrum, down to waves of infinite wave length and zero frequency, and on the other side up through the ultra violet spectrum through the X-ray spectrum, the gamma ray spectrum, and cosmic ray spectrum, up to frequencies ten million times higher than those of ordinary light. Most of our present knowledge of the sub-atomic world has come through the very recent increase in our ability to read the messages which come to us through these high frequencies."

HEREDITY FACTOR IN PERNICIOUS ANEMIA

Though the causes of pernicious anemia are still unknown, clues have been found that throw considerable light on their nature.

In a talk before the American Medical Association recently, Dr. Lewellys F. Barker of Baltimore stated that evidence at present points to hereditary predisposition as one of the main factors in its occurrence. The presence in the digestive tract of poisons liberated by bacteria or minute animal parasites constitutes an external agent of accessory influence.

The causes of the disturbance of the equilibrium between blood-destruction and blood-regeneration in this disease are becoming much clearer, declared Dr. Barker. The condition of anemia, a lack of red corpuscles in the blood, is now recognized, he said, as only one part of a comprehensive disease-entity in which the digestive system, the nervous system, and the endocrine system are all involved. Investigators are endeavoring to establish the precise place in the malady as a whole that should be assigned to each of these factors.

Though as yet no actual cure for this disease has been achieved, a patient's condition can be improved, according to Dr. Barker, and the progress of the malady held in check by various treatments with dilute hydrochloric acid, arsenic, blood injections and other measures. Early recognition of symptoms leading up to such a condition followed up with prompt treatment will tend to keep pernicious anemia latent. Dr. Barker strongly recommended that intermarriage of members of families in which it is known that the disease occurs should be discouraged.

ANCIENT TRADE ROUTES TRACED BY AMBER FINDS

The gradual unearthing of amber ornaments in graves and treasure hoards buried a thousand and more years before the Christian era, has enabled archaeologists to trace the trade routes of ancient Europe. J. M. de Novarro of Cambridge, in a recent talk before the Royal Geographic Society, said that amber was the one imperishable and still distinguishable object of barter exported from the north of Europe to the south in prehistoric times.

Chemical analysis, he stated, has shown that the fossilized resin of the Baltic regions contains considerable succinic acid present only in small percentages or not at all in the amber native to the south. This distinguishing characteristic of the northern amber, in addition to its comparative scarcity around the Mediterranean, has opened up an important means of tracing the prehistoric transcontinental trade routes to Italy.

The trade in amber, which was apparently very highly prized by the ancients, flourished during the bronze age, and it is considered likely that it led to the introduction of bronze into the north. During the middle bronze period Germany seems to have played a larger part in the trade than Italy, though it was probably through Italy that the amber reached the countries around the Aegean Sea. During the iron age commerce over the route through central Germany grew considerably, Italy exerting, in consequence, a more direct influence on the northern countries as their trade contacts increased. Later the eastern route came into use through Bohemia where thus far only occasional remains have been found.

Mr. Novarro believes that the amber trade reached its zenith around the seventh century B. C. After that it gradually declined until the fourth century when apparently amber went out of fashion altogether.

TESTS FOR COLOR BLINDNESS SHOULD BE MORE SEVERE

Only half of those dangerously color blind are eliminated by the usual tests used to select applicants for train, yard and engine service on railways. Dr. Archibald Chace, chief surgeon of the St. Louis Southwestern Railway Lines, made this startling statement in a talk on colorblindness in industry recently before the section of the American Medical Association on diseases of the eye.

He maintained that the devices simulating a lantern were the only type suitable for such tests. The ordinary field tests, he said, were of little value because they were made under ideal conditions and not such as would arise in emergencies and result in accident. They should be made under all the circumstances of steam, rain, fog, smoke, daylight, night or dawn that would arise under natural weather conditions by methods planned in advance to cover the 288 possible ways under which signal lamps or flags may be observed, he declared.

Dr. Chace, who has had seven years of experience in supervising the examination of applicants for hazardous occupations, said that tests for color blindness require

great expertness in their administration in order to achieve their end. He urged that the stations at which such tests are made be reduced to the fewest practical number and that the work be checked periodically.

Dr. Chace also made a point of distinguishing between color blindness and color ignorance. "From the standpoint of safety", he asked, "what difference does it make if the engineer can distinguish colors clearly by comparison, if he calls a red light yellow, or a green one blue?"

LONDON ZOO HAS WHITE ELEPHANT

The only real white elephant in captivity, so far as is known, has just been received at the London Zoo from Rangoon. The royal beast has been given a new house and will be paraded daily for inspection, but, on account of the semi-sacred character invested in white elephants by Burmese tradition, English youngsters will not be allowed to ride him according to the time honored custom of the British Zoo.

The elephant is the property of Dr. Saw Durmay Po Min, president of an organization of the native Christians of Burma, who has agreed to loan the valuable animal for exhibition purposes, a proportion of the receipts going to the association he represents.

"White elephants" are usually no more than pale grey. Such a one was exhibited in the United States by the Barnum and Bailey circus about forty years ago. This animal, however, is said to be almost pure white with the yellowish pink eyes of a true albino.

The London Zoo already possesses an albino rarity in the shape of a white cobra, while large crowds are flocking to the British Museum to see the white tiger just put on exhibition. This albino was shot in the jungle by the Maharajah of Rewa and presented by him to the King, who has loaned it temporarily to the Museum. The tiger is not pure white but rather cream colored, according to report, with greyish brown stripes in place of the usual conspicuous black bands, and is smaller than the typical Bengal tiger.

SUGAR MAY HELP RESIST INFECTION OF JOINTS

The sugar we eat may have a definite bearing on the ability of our joints to resist infection.

Dr. Ralph Pemberton of Philadelphia reported recently to the section of the American Medical Association on diseases of the bones and joints that the amount of sugar digested in the body has a well defined relationship to inflammation of the joints. In more than sixty persons with disturbances of the joints he found a low tolerance for sugar. Dr. Pemberton believes that control of sugar digestion is a factor in the healing of such diseases.

The condition is not the same as that which occurs in diabetes but seems to depend on some changes in the circulation of the blood. Low sugar tolerance was produced experimentally in individuals by changing the circulation through the administration of drugs. By these studies it was determined that sugar taken in through the mouth passes by way of the blood to the fluid of the joints and there is evidence indicating that it aids their resistance to infection.

LUNG CANCER INCREASES

Cancer is on the increase in the lungs as well as in all the other organs. In a report before the American Medical Association meeting recently Drs. John A. Lichty, F. R. Wright and E. A. Baumgartner of Clifton Springs, N. Y., presented figures to show that while cancer of the lungs is increasing along with cancer of all parts of the body it occurs proportionately less often in the lungs than in any other organ.

These views are in direct contrast to those of other observers who maintain that the inhalation of tar and oil particles and the irritation of the lungs following influenza have brought about a marked increase in the number of cases of cancer of the lung tissues. The New York doctors felt that there is no actual proof that the influenza epidemic has had any definite relationship to the growing amount of cancer of the lungs.

MANY HAVE IMMUNITY TO INFANTILE PARALYSIS

It is possible that many people have developed immunity to infantile paralysis through having been mildly infected on some previous occasion, Dr. W. L. Aycock of Boston said in an address recently before the section of the American Medical Association on preventive medicine.

While this disease undoubtedly spreads from person to person, he maintains that there are some instances in which it may not be due to either direct contact or through a carrier not suffering from the disease. It has been found that it may be transmitted through milk or some other indirect method.

DIABETES PATIENTS DE-VITAMINIZED

Very unusual symptoms have been developed in diabetes cases when the necessarily restricted diet has failed to include vitamin A and B. Grave danger has resulted from the choice of diets for such patients not under the careful supervision of a physician.

Dr. Michael Wohl of Omaha brought about much discussion in the section of the American Medical Association on pathology and physiology at its recent meeting by bringing to light these new facts. Many cases were reported in which the importance of vitamins had been overlooked by patients on special diets.

BOOK REVIEW

POPULAR RESEARCH NARRATIVES, VOLUME II. Collected by the Engineering Foundation. Williams and Wilkins Co., Baltimore, 1926. 174 pages. $1.00.

Fifty of the achievements of science, engineering, and invention, most of them recent, are recounted briefly and clearly in this book. Choosing a few discoveries out of the thousands that are annually announced is no easy task. The Engineering Foundation has not only picked subjects that are important to human welfare, but it has also succeeded in making a book of varied and entertaining reading.

Sir Ernest Rutherford discusses the possibility of utilizing atomic energy. M. Luckiesh tells how important artificial light has been in aiding our industrial development. Dr. William Crocker describes how the anesthetic ethylene was discovered because it put carnations in a greenhouse to sleep. And so on through the fifty accounts. The first volume of fifty narratives, which appeared in 1924, proved its right to the title "popular", This second volume is a worthy follower of the first.

A POPULAR GUIDE TO THE HEAVENS; by Sir Robert Stawell Ball, completely revised and edited by the Rev. T. E. R. Phillips. George Philip and Son, Ltd.; London, 1926. 84pp. & 86 plates; 15 shillings.

First published in 1892, under the title of "An Atlas of Astronomy", this book soon became invaluable to the amateur star-gazer who desired an accurate, but not too elaborate set of charts to aid his studies. It was revised in 1905 and 1910 by the original author, but since the third edition the advances of astronomy have been so rapid that in some places it was considerably behind the times. This, the fourth, edition has been brought up to date by the Rev. Phillips, who is secretary of the Royal Astronomical Society of Great Britain, and, obviously, well qualified for the task. The addition of a number of modern photographs, made at some of the greatest observatories, of comets, nebulae, star clusters, etc., add to the interest of the book. The charts are similar to those in the previous editions, though they, too, have been brought up to date when necessary, and with their aid one can identify an unknown planet in the sky, tell what constellations will be visible at a certain time of the year, or locate, with the aid of a small telescope, a particular crater on the moon. Though it is not addressed to the professional astronomer, knowledge of the barest essentials of astronomy is presupposed of the reader; but even if one does not have this, if supplemented with a good elementary general book on astronomy, such as Dr. C. G. Abbot's "The Earth and the Stars", it will serve admirably to introduce the layman to the mysteries of space.

Three million people died from smallpox in the East Indies in 1770 and 1771.